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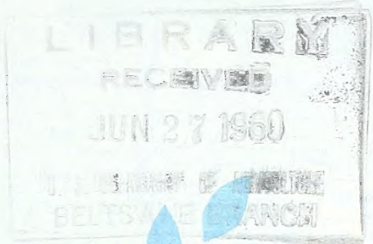
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**PLANT**

**HARDINESS**

**ZONE MAP**

Miscellaneous Publication No. 814

AGRICULTURAL RESEARCH SERVICE  
UNITED STATES DEPARTMENT OF AGRICULTURE



## INDICATOR PLANT EXAMPLES

Following are names of representative persistent plants listed under the coldest zones in which they will normally succeed. Such plants may serve as useful indicators of the cultural possibilities of each zone.

### ZONE 1 (below $-50^{\circ}$ F.)

*Betula glandulosa*  
*Empetrum nigrum*  
*Populus tremuloides*  
*Potentilla pensylvanica*  
*Rhododendron lapponicum*  
*Salix reticulata*

Dwarf birch  
Crowberry  
Quaking aspen  
Pennsylvania cinquefoil  
Lapland rhododendron  
Netleaf willow

### ZONE 2 ( $-50^{\circ}$ to $-40^{\circ}$ F.)

*Betula papyrifera*  
*Cornus canadensis*  
*Elaeagnus commutata*  
*Juniperus communis*  
*Picea glauca*  
*Potentilla fruticosa*

Paper birch  
Bunchberry dogwood  
Silverberry  
Common juniper  
White spruce  
Bush cinquefoil

### ZONE 3 ( $-40^{\circ}$ to $-30^{\circ}$ F.)

*Elaeagnus angustifolia*  
*Lonicera tatarica*  
*Malus baccata*  
*Parthenocissus quinquefolia*  
*Syringa vulgaris*  
*Thuja occidentalis*

Russian olive  
Tatarian honeysuckle  
Siberian crabapple  
Virginia creeper  
Common lilac  
American arbor-vitae

### ZONE 4 ( $-30^{\circ}$ to $-20^{\circ}$ F.)

*Berberis thunbergii*  
*Hydrangea paniculata*  
*Juniperus chinensis*  
*Ligustrum amurense*  
*Spiraea vanhouttei*  
*Taxus cuspidata*

Japanese barberry  
Panicled hydrangea  
Chinese juniper  
Amur River privet  
Vanhoutte spirea  
Japanese yew

### ZONE 5 ( $-20^{\circ}$ to $-10^{\circ}$ F.)

*Cornus florida*  
*Deutzia gracilis*  
*Forsythia ovata*  
*Ligustrum vulgare*  
*Parthenocissus tricuspidata*  
*Rosa multiflora*

Flowering dogwood  
Slender deutzia  
Early forsythia  
Common privet  
Boston ivy  
Japanese rose

ZONE 6  
(-10° to 0° F.)

*Acer palmatum*  
*Buxus sempervirens* (6b to 7)  
*Forsythia suspensa*  
*Hedera helix*  
*Ilex opaca*  
*Ligustrum ovalifolium*

Japanese maple  
Common box  
Weeping forsythia  
English ivy  
American holly  
California privet

ZONE 7  
(0° to 10° F.)

*Azalea* Kurume hyb. 'Hinodegiri'  
*Cedrus atlantica*  
*Cercis chinensis*  
*Chamaecyparis lawsoniana*  
*Cotoneaster salicifolia*  
*Ilex aquifolium*

Red Hussar azalea  
Atlas cedar  
Chinese redbud  
Lawson cypress  
Willowleaf cotoneaster  
English holly

ZONE 8  
(10° to 20° F.)

*Arbutus menziesi*  
*Choisya ternata*  
*Melia azedarach*  
*Olearia haasti*  
*Prunus laurocerasus*  
*Viburnum tinus*

Pacific madrone  
Mexican orange  
Chinaberry  
New Zealand daisy-bush  
Cherry-laurel  
Laurestinus

ZONE 9  
(20° to 30° F.)

*Arbutus unedo*  
*Eucalyptus globulus*  
*Grevillea robusta*  
*Myrtus communis*  
*Pittosporum tobira*  
*Quercus virginiana*

Strawberry tree  
Tasmanian blue gum  
Silk-oak  
Myrtle  
Japanese pittosporum  
Live oak

ZONE 10  
(30° to 40° F.)

*Acacia baileyana*  
*Arecastrum romanzoffianum*  
*Bougainvillea spectabilis*  
*Casuarina equisetifolia*  
  
*Eucalyptus citriodora*  
*Ficus macrophylla*

Cootamundra wattle  
Queen palm  
Bougainvillea  
Horsetail beefwood  
(Australian pine)  
Lemon eucalyptus  
Moreton bay fig



# Cold Hardiness Ratings for Some Additional Woody Plants

	Zone		Zone
<i>Abeliophyllum distichum</i> (white forsythia)....	5b	<i>Hypericum patulum</i> 'Hidcote' (Hidcote St. Johnswort)....	7
<i>Acer platanoides</i> (Norway maple).....	4	<i>Iberis sempervirens</i> (evergreen candytuft)....	6
<i>Aesculus carnea</i> (red horsechestnut).....	4	<i>Ilex crenata convexa</i> (convexleaf Japanese holly)....	7
<i>Arctostaphylos uva-ursi</i> (bearberry).....	3	<i>Jacaranda acutifolia</i> (jacaranda).....	10
<i>Azalea Indian hybrid</i> (Indian azalea).....	9	<i>Juglans regia</i> (English or Persian walnut)....	6
<i>Azalea Kurume hybrid</i> (Kurume azalea)....	7	<i>Juniperus horizontalis</i> (creeping juniper)....	3
<i>Azalea Mollis hybrid</i> (Mollis azalea).....	5	<i>Koelreuteria paniculata</i> (goldenrain-tree)....	6
<i>Bauhinia variegata</i> (purple orchid tree)....	10	<i>Laburnum watereri</i> (Waterer laburnum)....	6
<i>Berberis darwini</i> (Darwin barberry).....	8	<i>Lagerstroemia indica</i> (crapemyrtle).....	7
<i>Betula pendula</i> (European white birch).....	2	<i>Mahonia aquifolium</i> (Oregon hollygrape)....	6
<i>Bouvardia 'Coral'</i> (Coral bouvardia).....	9	<i>Malus arnoldiana</i> (Arnold crabapple).....	5
<i>Butia capitata</i> (Pindo palm).....	8b	<i>Metasequoia glyptostroboides</i> (Dawn redwood)....	5b
<i>Camellia reticulata</i> (reticulata camellia)....	9	<i>Nerium oleander</i> (oleander).....	8
<i>Camellia sasanqua</i> (sasanqua camellia).....	7b	<i>Olea europaea</i> (common olive).....	9
<i>Carya pecan</i> 'Major' (pecan).....	5 (grows) 6 (fruits)	<i>Picea abies</i> (Norway spruce).....	2
<i>Ceanothus impressus</i> (Santa Barbara ceanothus)....	8	<i>Pieris japonica</i> (Japanese andromeda).....	6
<i>Cedrus deodara</i> (deodar cedar).....	7b	<i>Pinus mugo mughus</i> (Mugho pine).....	3
<i>Chamaecyparis pisifera</i> (Sawara cypress)....	4	<i>Pinus radiata</i> (Monterey pine).....	7
<i>Cinnamomum camphora</i> (camphor tree).....	9	<i>Pinus strobus</i> (white pine).....	4
<i>Cistus laurifolius</i> (laurel rock-rose).....	7	<i>Raphiolepis indica rosea</i> (pink raphiolepis)...	8
<i>Cistus purpureus</i> (purple rock-rose).....	8	<i>Rhododendron 'America'</i> (hybrid rhododendron)....	5
<i>Cornus alba</i> (Tatarian dogwood).....	3	<i>Rhododendron loderi</i> 'King George' (hybrid rhododendron)....	8
<i>Cytisus praecox</i> (Warminster broom).....	6	<i>Rhododendron 'Purple Splendor'</i> (hybrid rhododendron)....	7
<i>Elaeagnus multiflora</i> (cherry multiflora)....	5	<i>Rosa rugosa</i> (rugosa rose).....	3
<i>Elaeagnus pungens</i> (thorny elaeagnus).....	7	<i>Schinus terebinthifolius</i> (Brazilian pepper tree)....	9
<i>Eriobotrya japonica</i> (loquat).....	8	<i>Sequoia sempervirens</i> (redwood).....	8
<i>Euonymus alatus</i> (winged euonymus).....	4	<i>Sequoiadendron giganteum</i> (giant sequoia)...	7
<i>Euphorbia pulcherrima</i> (poinsettia).....	10	<i>Ulmus americana</i> (American elm).....	2
<i>Fremontia mexicana</i> (San Diego fremontia)...	9	<i>Zelkova serrata</i> (Japanese zelkova).....	6
<i>Ginkgo biloba</i> (ginkgo, maidenhair-tree)....	5		
<i>Hibiscus rosa-sinensis</i> (Chinese hibiscus)....	9b		
<i>Hibiscus syriacus</i> (shrub althea).....	6		

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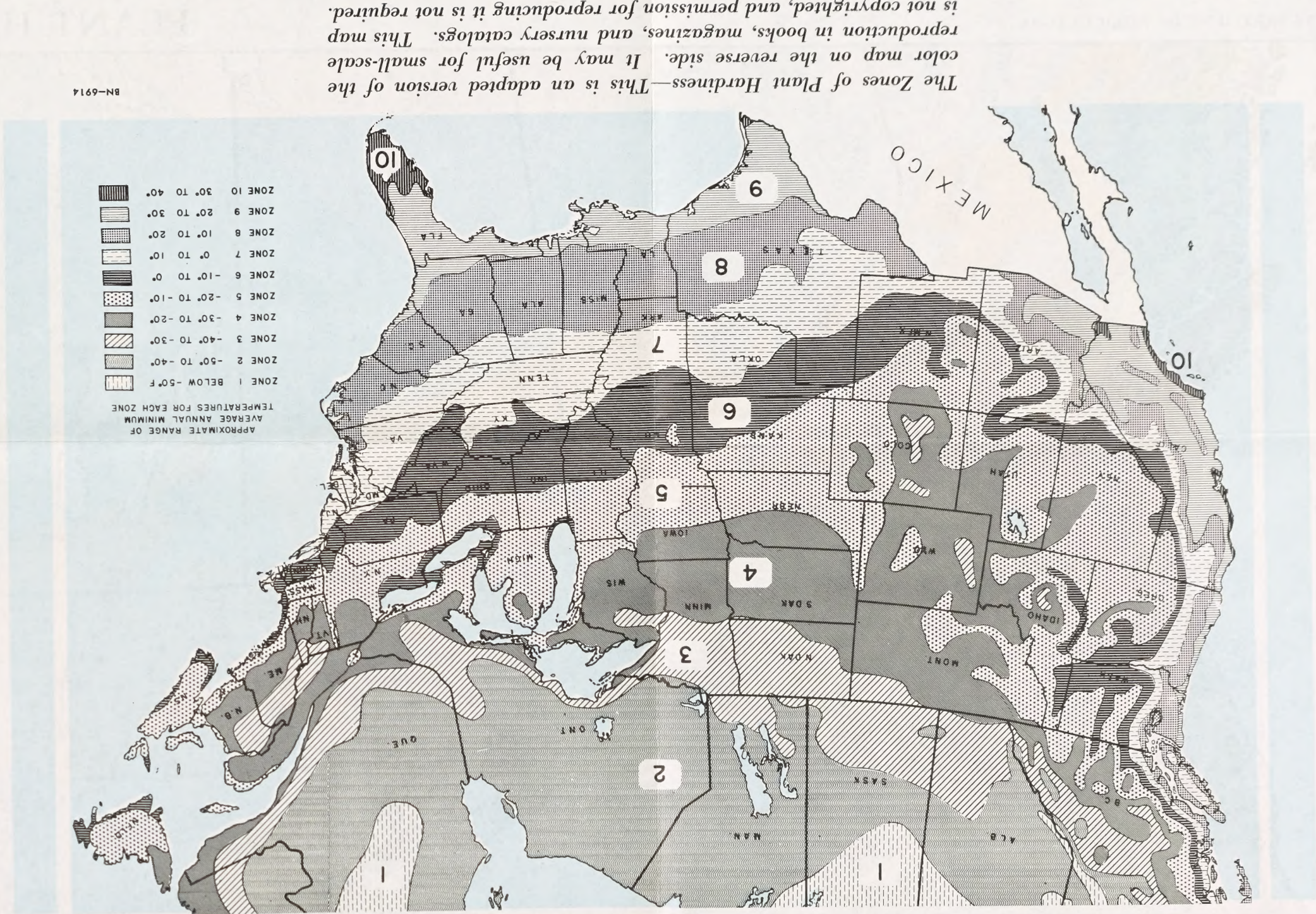
INDICATOR PLANT EXAMPLES

Japanese maple	Common box	Weeping forsythia	English ivy	American holly	California privet
<i>Acer palmatum</i>	<i>Buxus sempervirens</i> (6b to 7)	<i>Forsythia suspensa</i>	<i>Hedera helix</i>	<i>Ilex opaca</i>	<i>Ligustrum ovalifolium</i>
ZONE 6	(-10° to 0° F.)				
Red Husar azalea	Atlas cedar	Chinese redbud	Lawson cypress	Willowleaf cottonaster	English holly
<i>Azalea Kurume</i> hyb. 'Hinodegiri'	<i>Cedrus atlantica</i>	<i>Cercis chinensis</i>	<i>Chamaecyparis lawsoniana</i>	<i>Cotoneaster salicifolia</i>	<i>Ilex aquifolium</i>
ZONE 7	(0° to 10° F.)				
Arbutus menziesi	Choisya ternata	Melia azedarach	Olearia haasi	Prunus laurocerasus	Viburnum tinus
ZONE 8	(10° to 20° F.)				
Pacific madrone	Mexican orange	Chinaberry	New Zealand daisy-bush	Cherry-laurel	Laurestinus
Strawberry tree	Tasmanian blue gum	Silk-oak	Myrtle	Japanese pittosporum	Live oak
ZONE 9	(20° to 30° F.)				
Arbutus unedo	Eucalyptus globulus	Grevillea robusta	Myrtus communis	Pittosporum lobata	Quercus virginiana
ZONE 10	(30° to 40° F.)				
Acacia baileyana	Arceuthobium tomentosum	Bougainvillea spectabilis	Casuarina equisetifolia	Eucalyptus citriodora	Ficus macrophylla
Coolamandra wattie	Queen palm	Bougainvillea	Hortellai beechwood	Lemon eucalyptus	Moreton bay fig

Belula glandulosa	Empetrum nigrum	Populus tremuloides	Populus pennsylvanica	Rhododendron lapponicum	Salix reticulata
Belula papyrifera	Cornus canadensis	Blagaynus communis	Picea glauca	Potentilla fruticosa	
ZONE 2	(-50° to -40° F.)				
Paper birch	Bunchberry dogwood	Silverberry	Common juniper	White spruce	Bush cinquefoil
ZONE 3	(-40° to -30° F.)				
Russian olive	Tatarian honeysuckle	Siberian crabapple	Virginia creeper	Common lilac	American arbor-vitae
ZONE 4	(-30° to -20° F.)				
Japanese barberry	Panicle hydrangea	Chinese juniper	Amur River privet	Vanhoutte spirea	Japanese yew
Flowering dogwood	Slender dentzia	Early forsythia	Common privet	Boston ivy	Japanese rose
ZONE 5	(-20° to -10° F.)				
Cornus florida	Deutzia gracilis	Forsythia ovata	Ligustrum vulgare	Parthenocissus tricuspidata	Rosa multiflora

Following are names of representative persistent plants listed under the coldest zones in which they will normally succeed. Such plants may serve as useful indicators of the cultural possibilities of each zone.

INDICATOR PLANT EXAMPLES



The Zones of Plant Hardiness—This is an adapted version of the color map on the reverse side. It may be useful for small-scale reproduction in books, magazines, and nursery catalogs. This map is not copyrighted, and permission for reproducing it is not required.

PLANT HARDINESS ZONE MAP

Prepared by the U.S. National Arboretum, Agricultural Research Service, U.S. Department of Agriculture in cooperation with the American Horticultural Society<sup>1</sup>

This map shows in moderate detail the expected minimum temperatures of most of the horticulturally important areas of the United States (excluding Alaska and Hawaii) and Canada. It shows 10 different zones, each of which represents an area of winter hardiness for certain ornamental plants.

Cold hardiness zones for the United States area of this map are based on isotherms of average minimum winter temperatures for the years 1899 through 1938. Readjustments were made for 34 States on the basis of January mean minimum temperatures for 1931 through 1952, as published by the U.S. Weather Bureau.

Data for the adjacent area in Canada were provided by the Canadian Meteorological Division, and are based on a 20- to 40-year period.

Data from both sources in the United States and Canada have been modified or reinterpreted in many localities to conform with recent and more detailed information provided by State experiment stations and numerous individual cooperators.

HOW TO USE THE MAP

Each zone of the map on the reverse side has been subdivided into darker-colored and lighter-colored sections that represent 5-degree differentials within the 10-degree zone. The lighter color of each zone represents the colder section; the darker color, the warmer section. The accompanying table lists representative plants that normally survive in each zone.

The hardiness zones should be enough for most general reference purposes. However, plant survival differences can be noted at smaller north-south progressions than a full zone represents. When this additional detail is needed, use the 5-degree differentials within the 10-degree zone.

Some examples of these differences are as follows: Saucer magnolia (*Magnolia soulangeana*) and wisteria (*Wisteria sinensis*) are suit-

<sup>1</sup> Based on studies conducted by a commission of the Society (formerly the American Horticultural Council) upon recommendation of the American Association of Nurserymen. Further background information may be found in an article titled, *The Geographic Charting of Plant Climatic Adaptability*, by H. T. Skinner, Report of the 15th International Horticultural Congress, 1958.

able for zone 5b, but not for zone 5a; orchard peaches (*Prunus persica*) are suitable in zone 6b, but will also succeed in those parts of zone 6a that are relatively free of late frosts; Japanese camellia (*Camellia japonica*), Chinese holly (*Ilex cornuta*), and Southern magnolia (*Magnolia grandiflora*) are suitable in zone 7b but doubtful in 7a.

In determining if a certain plant will survive in a given zone, it is necessary to consider factors other than the minimum temperature range of each zone. For example, temperatures of adjacent zones become increasingly similar near their boundaries. Moreover, there are innumerable island climates that may be considerably milder or colder than the zone average. These islands are especially frequent in hilly or mountainous areas. Mountainous areas on this map are not shown to be as cold as might be expected. The reason for this is that most weather stations from which records were obtained are located in valleys where temperatures tend to be somewhat milder, and where plants are most likely to be cultivated.

Other plant-growth factors must also be considered. Frost occurrence, seasonal rainfall distribution, humidity, soil characteristics, and duration and intensity of sunlight may bear little relationship to mean winter temperatures. The combined effects of all factors determine true plant adaptability. They would be difficult to depict geographically.

Minimum temperatures, on the other hand, can be readily depicted. They are of prime importance in plant survival. Their effects can seldom be changed by cultural practices.

A plant species that flourishes in one part of a given zone is likely to be adaptable in other parts of the same zone or in a warmer zone. Other growth factors, such as rainfall, soil, and summer heat, have to be reasonably comparable, however, or capable of being made comparable through irrigation, soil correction, wind protection, partial shade, or humidity control. Frost dates, length of growing season, and minimum winter temperatures are among the least readily controlled of the major factors that govern the geographic adaptability of plants.

The zone in which a given plant may survive is not necessarily the zone in which it should generally be recommended for planting. *Abelia grandiflora*, for example, usually survives as a low-growing, winter-retarded specimen in the colder areas of zone 6 or even in zone 5. It develops and flowers normally, however, in zone 7. This species, therefore, should be properly recommended for zones 7 and above.

Some gardeners may question a zone rating when a plant fails to survive its first winter. A single test, however, is rarely reliable. A small, young plant may be tender, whereas an older plant may become quite hardy. Cultural conditions may affect the degree of hardiness. Furthermore, no single winter is ever quite average; some may be more severe than others in suddenness of freezing or in degrees of frost registered.

Cold Hardiness Ratings for Some Additional Woody Plants

Zone	Zone
<i>Abeliophyllum distichum</i> (white forsythia).....	5b
<i>Acer platanoides</i> (Norway maple).....	4
<i>Aesculus carnea</i> (red horsechestnut).....	4
<i>Arctostaphylos uva-ursi</i> (bearberry).....	3
<i>Azalea Indian hybrid</i> (Indian azalea).....	9
<i>Azalea Kurume hybrid</i> (Kurume azalea).....	7
<i>Azalea Mollis hybrid</i> (Mollis azalea).....	5
<i>Bauhinia variegata</i> (purple orchid tree).....	10
<i>Berberis darwini</i> (Darwin barberry).....	8
<i>Betula pendula</i> (European white birch).....	2
<i>Bouvardia 'Coral'</i> (Coral bouvardia).....	9
<i>Butia capitata</i> (Pindo palm).....	8b
<i>Camellia reticulata</i> (reticulata camellia).....	9
<i>Camellia sasanqua</i> (sasanqua camellia).....	7b
<i>Carya pecan 'Major'</i> (pecan).....	5 (grows 6 (fruits)
<i>Ceanothus impressus</i> (Santa Barbara ceanothus).....	8
<i>Cedrus deodara</i> (deodar cedar).....	7b
<i>Chamaecyparis pisifera</i> (Sawara cypress).....	4
<i>Cinnamomum camphora</i> (camphor tree).....	9
<i>Cistus laurifolius</i> (laurel rock-rose).....	7
<i>Cistus purpureus</i> (purple rock-rose).....	8
<i>Cornus alba</i> (Tatarian dogwood).....	3
<i>Cytisus praecox</i> (Warminster broom).....	6
<i>Elaeagnus multiflora</i> (cherry multiflora).....	5
<i>Elaeagnus pungens</i> (thorny elaeagnus).....	7
<i>Eriobotrya japonica</i> (loquat).....	8
<i>Euonymus alatus</i> (winged euonymus).....	4
<i>Euphorbia pulcherrima</i> (poinsettia).....	10
<i>Fremontia mexicana</i> (San Diego fremontia).....	9
<i>Ginkgo biloba</i> (ginkgo, maidenhair-tree).....	5
<i>Hibiscus rosa-sinensis</i> (Chinese hibiscus).....	9b
<i>Hibiscus syriacus</i> (shrub althea).....	6
<i>Hypericum patulum</i> 'Hidecote' (Hidecote St. Johnswort).....	7
<i>Iberis sempervirens</i> (evergreen candytuft).....	6
<i>Ilex crenata convexa</i> (convexleaf Japanese holly).....	7
<i>Jacaranda acutifolia</i> (jacaranda).....	10
<i>Juglans regia</i> (English or Persian walnut).....	6
<i>Juniperus horizontalis</i> (creeping juniper).....	3
<i>Koeleruteria paniculata</i> (goldenrain-tree).....	6
<i>Laburnum watereri</i> (Waterer laburnum).....	6
<i>Lagerstroemia indica</i> (crapemyrtle).....	7
<i>Mahonia aquifolium</i> (Oregon hollygrape).....	6
<i>Malus arnoldiana</i> (Arnold crabapple).....	5
<i>Metasequoia glyptostroboides</i> (Dawn redwood).....	5b
<i>Nerium oleander</i> (oleander).....	8
<i>Olea europaea</i> (common olive).....	9
<i>Picea abies</i> (Norway spruce).....	2
<i>Pieris japonica</i> (Japanese andromeda).....	6
<i>Pinus mugo mughus</i> (Mugho pine).....	3
<i>Pinus radiata</i> (Monterey pine).....	7
<i>Pinus strobus</i> (white pine).....	4
<i>Raphiolepis indica rosea</i> (pink raphiolepis).....	8
<i>Rhododendron 'America'</i> (hybrid rhododendron).....	5
<i>Rhododendron loderi</i> 'King George' (hybrid rhododendron).....	8
<i>Rhododendron 'Purple Splendor'</i> (hybrid rhododendron).....	7
<i>Rosa rugosa</i> (rugosa rose).....	3
<i>Schinus terebinthifolius</i> (Brazilian pepper tree).....	9
<i>Sequoia sempervirens</i> (redwood).....	8
<i>Sequoiadendron giganteum</i> (giant sequoia).....	7
<i>Ulmus americana</i> (American elm).....	2
<i>Zelkova serrata</i> (Japanese zelkova).....	6

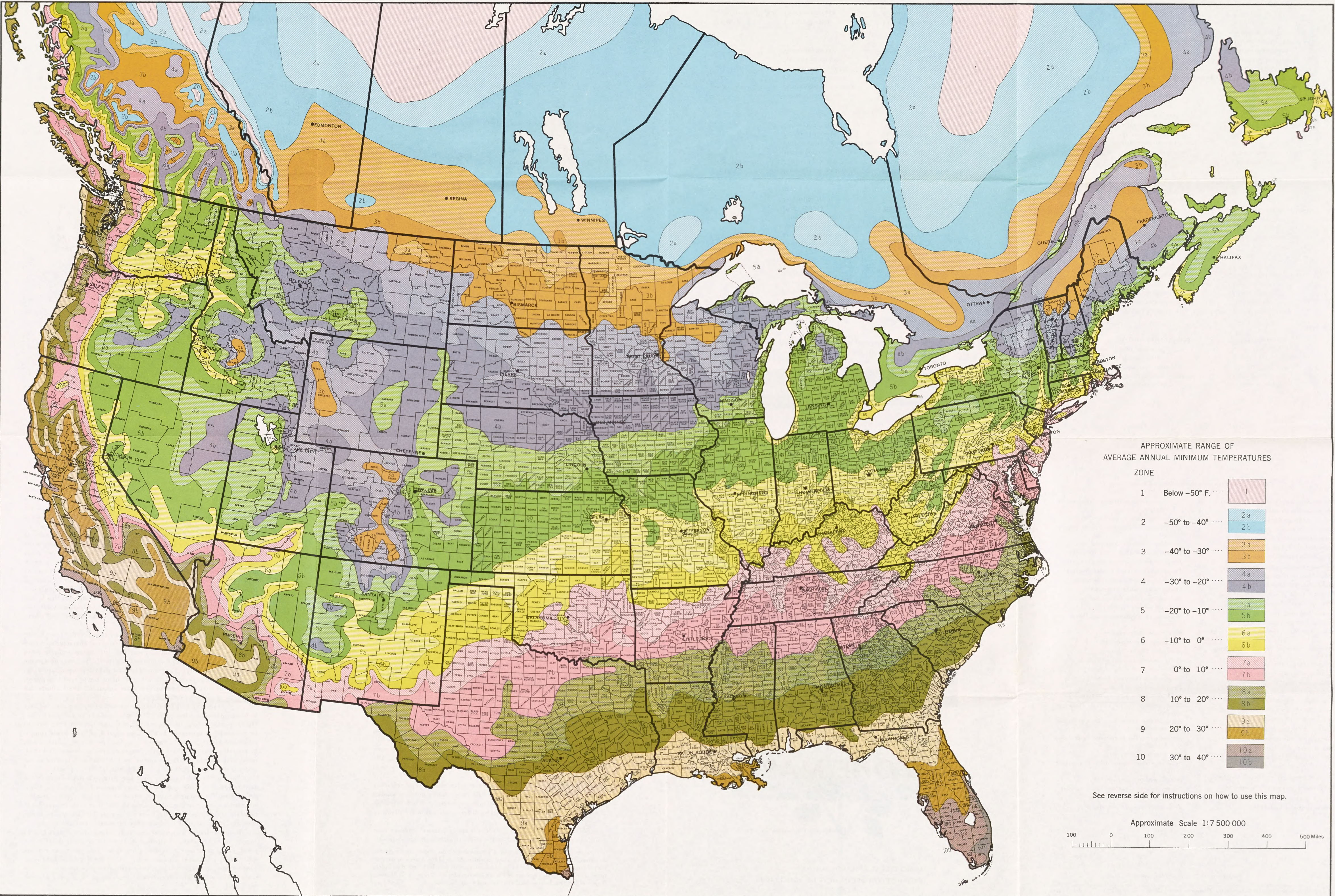
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UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D.C. Issued May 1960



PLANT HARDINESS ZONE MAP



APPROXIMATE RANGE OF  
AVERAGE ANNUAL MINIMUM TEMPERATURES  
ZONE

1	Below -50° F. ....	1
2	-50° to -40° ....	2a 2b
3	-40° to -30° ....	3a 3b
4	-30° to -20° ....	4a 4b
5	-20° to -10° ....	5a 5b
6	-10° to 0° ....	6a 6b
7	0° to 10° ....	7a 7b
8	10° to 20° ....	8a 8b
9	20° to 30° ....	9a 9b
10	30° to 40° ....	10a 10b

See reverse side for instructions on how to use this map.

Approximate Scale 1:7 500 000

